AMENDMENTS TO THE CLAIMS

Please amend claims 13-19, 142, and 156. Please also add new claims 159-162. Deletions appear in ~~strikethrough font~~, and additions are <u>underlined</u>. This listing of claims will replace all prior versions and listings of claims in the application.

Claims 1-6 (Canceled)

7. (Previously presented) The method of claims 142 or 13, wherein the characteristic peaks are determined by computing the variance of the diffraction patterns.

Claims 8-10 (Canceled)

11. (Previously presented) The method of claim 142, wherein determining the similarities based on the peaks comprises:
    detecting crystalline peaks in the diffraction patterns; and
    matching the diffraction patterns based on the detected crystalline peaks.

12. (Previously presented) The method of claim 142, wherein determining the similarities based on the peaks comprises:
    detecting amorphous peaks in the diffraction patterns; and
    matching the diffraction patterns based on the detected amorphous peaks.

13. (Currently amended) The method of claim 142, wherein the characteristic peaks are detected by a method comprising:
    determining the ~~characteristic~~ peaks of the diffraction patterns;<u> and</u>
    assigning probability scores to the determined ~~characteristic~~ peaks of the diffraction pattern~~; and~~

    ~~discretely allocating the determined characteristic peaks into one or more groups based on the assigned probability scores.~~

14. (Currently amended) The method of claim 142, wherein determining the first similarity comprises comparing one or more ~~detected~~ characteristic peaks in the first diffraction pattern with one or more ~~detected~~ characteristic peaks in the second diffraction pattern.

15. (Currently amended) The method of claim~~s~~ ~~13 or~~ 157 or 158, wherein discretely allocating the ~~determined~~ characteristic peaks comprises discretely allocating the ~~determined~~ characteristic peaks into a first, a second, a third, and a fourth group based on the assigned probability scores.

16. (Currently amended) The method of claim 15, wherein determining the similarities based on the ~~detected~~ characteristic peaks comprises comparing one or more ~~detected~~ characteristic peaks in the first diffraction pattern with one or more ~~detected~~ characteristic peaks in the second diffraction pattern.

17. (Currently amended) The method of claim 16, wherein comparing one or more ~~detected~~ characteristic peaks in the first diffraction pattern with one or more ~~detected~~ characteristic peaks in the second diffraction pattern further comprises:

for each characteristic peak in the first group of the first diffraction pattern, comparing the characteristic peak in the first group of the first diffraction pattern with the characteristic peaks in the first, second, or third group of the second diffraction pattern and penalizing a matching score if the characteristic peak in the first group of the first diffraction pattern is not found in the first, second, or third group of the second diffraction pattern.

18. (Currently amended) The method of claim 17, wherein comparing one or more ~~detected~~ characteristic peaks in the first diffraction pattern with one or more ~~detected~~ characteristic peaks in the second diffraction pattern further comprises:

for each characteristic peak in the second group of the first diffraction pattern, comparing the characteristic peak in the second group of the first diffraction pattern with the characteristic peaks in the first, second, third, or fourth group of the second diffraction pattern and penalizing a matching score if the characteristic peak in the first

group of the first diffraction pattern is not found in the first, second, third, or fourth group of the second diffraction pattern.

19. (Currently amended) The method of claim 16, wherein matching the diffraction patterns based on the ~~detected~~ characteristic peaks further comprises comparing one or more ~~detected~~ characteristic peaks in the second diffraction pattern with one or more ~~detected~~ characteristic peaks in the first diffraction pattern.

Claims 20-32 (Canceled)

33. (Previously presented) The method of claim 142, further comprising X-shifting the first diffraction pattern prior to determining the similarity between the first diffraction pattern and the second diffraction pattern and determining the similarity between the first diffraction pattern and the third diffraction pattern.

34. (Canceled)

35. (Original) The method of claim 16, wherein comparing the peaks further comprises matching a split peak with a peak having a shoulder as an acceptable match.

Claims 36-141 (Canceled)

142. (Currently amended) A method of analyzing patterns, comprising:
receiving a first diffraction pattern;
receiving a second diffraction pattern;
receiving a third diffraction pattern;
detecting the characteristic peaks of the first diffraction pattern;
detecting the characteristic peaks of the second diffraction pattern;
detecting the characteristic peaks of the third diffraction pattern;
determining a first similarity between the first and the second diffraction patterns based on the characteristic peaks of the first and the second diffraction patterns;
determining a second similarity between the first and the third diffraction patterns based on the characteristic peaks of the first and the third diffraction patterns;

determining a third similarity between the second and the third diffraction patterns based on the characteristic peaks of the second and the third diffraction patterns; ~~and~~

performing hierarchical cluster analysis on the first, the second, and the third diffraction pattern based on the determined first, the second, and the third similarity; and

displaying the relationship among the received diffraction patterns.

Claims 143-154 (Canceled)

155. (Previously presented) The method of claim 33, wherein the X-shifting is done automatically.

156. (Currently amended) A method of analyzing patterns, comprising:

receiving a first diffraction pattern;

receiving a second diffraction pattern;

determining the characteristic peaks of the first diffraction pattern;

determining the characteristic peaks of the second diffraction pattern;

determining a similarity between the first and the second diffraction patterns based on the characteristic peaks of the first and the second diffraction patterns;

~~and~~ performing hierarchical cluster analysis on the first and second diffraction pattern based on the determined similarity; and

and displaying the relationship among the received diffraction patterns.

157. (Previously presented) The method of claim 156, wherein the characteristic peaks are detected by a method comprising:

determining the characteristic peaks of the diffraction patterns;

assigning probability scores to the determined characteristic peaks of the diffraction pattern; and

discretely allocating the determined characteristic peaks into one or more groups based on the assigned probability scores.

158. (Previously presented) The method of claim 157, wherein discretely allocating the determined characteristic peaks comprises discretely allocating the

determined characteristic peaks into more than one group based on the assigned probability scores.

159. (New) The method of claims 13 or 157 further comprising classifying the characteristic peaks by discretely allocating the determined characteristic peaks into one or more groups based on the assigned probability scores.

160. (New) A method of analyzing patterns, comprising:

receiving a first diffraction pattern;

receiving a second diffraction pattern;

receiving a third diffraction pattern;

detecting the characteristic peaks of the first diffraction pattern;

detecting the characteristic peaks of the second diffraction pattern;

detecting the characteristic peaks of the third diffraction pattern;

wherein the characteristic peaks of the first, second, and third diffraction patterns are detected by determining the peaks of the first, second, and third diffraction patterns and assigning probability scores to the determined peaks of the first, second, and third diffraction patterns;

determining a first similarity between the first and the second diffraction patterns based on the characteristic peaks of the first and the second diffraction patterns;

determining a second similarity between the first and the third diffraction patterns based on the characteristic peaks of the first and the third diffraction patterns;

determining a third similarity between the second and the third diffraction patterns based on the characteristic peaks of the second and the third diffraction patterns; and

performing hierarchical cluster analysis on the first, the second, and the third diffraction pattern based on the determined first, the second, and the third similarity; and displaying the relationship among the received diffraction patterns.

161. (New) The method of claims 13, 142 or 160 wherein the relationship among the received diffraction patterns is displayed as a dendrogram.

162. (New) The method of claim 159 wherein the relationship among the received diffraction patterns is displayed as a dendrogram.